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Notes:

1. Untranslatable words are replaced with asterisks (***).
2. Texts in the figures are not translated and shown as it is.

Translated: 04:04:54 JST 07/31/2008

Dictionary: Last updated 07/18/2008 / Priority: 1. Electronic engineering / 2. Mechanical engineering / 3. JIS (Japan Industrial Standards) term

FULL CONTENTS

[Claim(s)]

[Claim 1] In the package made from a laminate film which arranged the weld nature resin film on the inner surface of metallic foil, a plus terminal, Have the generation element which consists of an electrode group which consists of the negative electrode and a separator, and weld obturation of the periphery part of the package to apply is carried out. The electrode terminal connected to a plus terminal and each negative electrode is the nonaqueous electrolyte secondary battery which consists of said generation element in the mode penetrated to the exterior of said periphery part. The nonaqueous electrolyte secondary battery characterized by the part in said generation element consisting of the high gel electrolyte of electrolytic solution holdout, and coming to carry out weld obturation of all the periphery parts of said package at abbreviation coincidence.

[Claim 2] In the package made from a laminate film which arranged the weld nature resin film on the inner surface of metallic foil, a plus terminal, Have the generation element which consists of an electrode group which consists of the negative electrode and a separator, and weld obturation of the periphery part of the package to apply is carried out. The electrode terminal connected to a plus terminal and each negative electrode is the nonaqueous electrolyte secondary battery which consists of said generation element in the mode penetrated to the exterior of said periphery part. The nonaqueous electrolyte secondary battery characterized by the part in said generation element consisting of the high gel electrolyte of electrolytic solution holdout, and all the periphery parts of said package coming to distribute an indentation pattern at abbreviation homogeneity.

[Claim 3] The nonaqueous electrolyte secondary battery according to claim 1 or 2 characterized by becoming said periphery part in which said electrode terminal is located in the mode in which said some of weld nature resin films project.

[Claim 4] The reducing work process which performs reducing work to a laminate film, and a

separator, The connection process to which a plus terminal plate and a negative electrode plate are made to laminate or wind around through the high gel electrolyte of electrolytic solution holdout, the electrode group which is a generation element is formed in, and a positive pole terminal and a negative pole terminal, and said electrode group are connected, [the mode which makes said generation element include and exposes an electrode terminal to the exterior of a laminate film periphery part] the heavy process which piles up the laminate film with which reducing work was performed, and a laminate film, the sealing process which presses simultaneously all the periphery parts of the piled-up laminate film, and carries out weld obturation, ** and others -- the manufacture method of the nonaqueous electrolyte secondary battery characterized by things.

[Claim 5] The manufacture method of the nonaqueous electrolyte secondary battery according to claim 4 characterized by performing said sealing process after decompressing atmosphere in predetermined atmospheric pressure.

[Claim 6] The manufacture method of the nonaqueous electrolyte secondary battery according to claim 5 characterized by said predetermined atmospheric pressure being 0.5 atmosphere or less.

[Claim 7] Said sealing process is the manufacture method of the nonaqueous electrolyte secondary battery according to claim 4 characterized by considering it as the process which performs the press between which the sheet member was made to be placed in the polymerization field of said electrode terminal and all the periphery parts of the piled-up laminate film.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the nonaqueous electrolyte secondary battery included [were included and the generation element was closed by the film-like package] by weld of the nonaqueous electrolyte secondary battery of a direct vent type, especially resin of a periphery part with the flat type, and its manufacture method.

[0002]

[Description of the Prior Art] The small weight saving of the general user-oriented portable device is progressing by big progress of electronic technology in recent years. The construction material currently especially used for the direct vent type battery of a nonaqueous electrolyte system about progress of a small weight saving from the field of the package of a battery has converted into light construction material, such as aluminum, from heavy construction material, such as iron or stainless steel. For example, what has allotted the

synthetic resin layer to the both sides by making aluminum foil into a core material about the laminate film is in use.

[0003] Next, the manufacture method of the conventional nonaqueous electrolyte secondary battery using the laminate film to apply is explained. By the conventional manufacture method, a laminate film is first made into the shape of a bag by carrying out weld obturation of the laminate film periphery part of others except a part of laminate film periphery part for every one battery. Next, the laminate film periphery part by which weld obturation is not carried out is used as an opening, and nonaqueous electrolyte is poured in while inserting the electrode group which consists of the plus terminal plate, negative electrode plate, and separator which are a generation element into this bag from the starting opening. Finally, after the point of an electrode terminal has projected from the opening, an opening is obturated. Manufacture of the nonaqueous electrolyte secondary battery was performed by the above process.

[Problem to be solved by the invention]

[0004] However, by the manufacture method of the above conventional nonaqueous electrolyte secondary battery, after performing weld obturation of laminate film periphery parts other than an opening and performing pressure reduction and pouring in after that, in order to carry out weld obturation of the opening, weld obturation of the laminate film periphery part needed to be performed 2 times or more. Thus, there was a problem of nonuniformity, such as a wrinkle, arising by performing weld obturation 2 times or more in the periphery part of the laminate film which the periphery part, especially lead tip part of the laminate film have projected, the sealing nature of a nonaqueous electrolyte secondary battery falling, and the yield falling remarkably.

[0005] While this invention is made in view of the problem in the above conventional technology, raises the yield and raising sealing nature, it aims at supplying the inexpensive high nonaqueous electrolyte secondary battery and its manufacture method of productivity by reducing a process number.

[0006]

[Means for solving problem] This 1st invention which solves said technical problem in the package made from a laminate film which arranged the weld nature resin film on the inner surface of metallic foil A plus terminal, Have the generation element which consists of an electrode group which consists of the negative electrode and a separator, and weld obturation of the periphery part of the package to apply is carried out. The electrode terminal connected to a plus terminal and each negative electrode is the nonaqueous electrolyte secondary battery which consists of said generation element in the mode penetrated to the exterior of said periphery part. The part in said generation element consists of the high gel electrolyte of electrolytic solution holdout, and all the periphery parts of said package are the nonaqueous electrolyte secondary batteries characterized by coming to carry out weld obturation at

abbreviation coincidence.

[0007] Therefore, according to the nonaqueous electrolyte secondary battery of invention of this application 1st, since it comes to carry out weld obturation of all the periphery parts of said package at abbreviation coincidence, there is an advantage whose yield sealing nature improves and improves.

[0008] This 2nd invention in the package made from a laminate film which arranged the weld nature resin film on the inner surface of metallic foil Moreover, a plus terminal, It has the generation element which consists of an electrode group which consists of the negative electrode and a separator, and nonaqueous electrolyte. The electrode terminal which weld obturation of the periphery part of the package to apply was carried out, and was connected to a plus terminal and each negative electrode is the nonaqueous electrolyte secondary battery which consists of said generation element in the mode penetrated to the exterior of said periphery part. It is the nonaqueous electrolyte secondary battery characterized by the part in said generation element consisting of the high gel electrolyte of electrolytic solution holdout, and all the periphery parts of said package coming to distribute an indentation pattern at abbreviation homogeneity.

[0009] Therefore, according to the nonaqueous electrolyte secondary battery of invention of this application 2nd, since all the periphery parts of said package come to distribute an indentation pattern at abbreviation homogeneity, the intensity of the whole package is made to be able to improve and sealing nature can be raised. Moreover, poor products can be certainly discovered by making into an inspection index the pattern which takes at the time of product inspection. Moreover, the outflow of resin at the time of weld closure can be prevented. Furthermore, stress, such as thermal expansion of a laminate film, can be distributed and sealing nature can be raised.

[0010] Moreover, this 3rd invention is characterized by becoming said periphery part in which said electrode terminal is located in the mode in which said some of weld nature resin films project.

[0011] therefore, [become / according to the nonaqueous electrolyte secondary battery of invention of this application 3rd / in the mode in which said some of weld nature resin films project / said periphery part in which said electrode terminal is located] The part located in the periphery part side of an electrode terminal is covered with said weld nature resin film, said electrode terminal touches on said package by bending etc., and it can prevent that current is revealed. Moreover, the stress concentration of all the periphery parts of said package is avoided, and the intensity of the whole package is raised. Furthermore, there is an advantage which is made to avoid the stress concentration of the periphery part of the package with which an electrode terminal is located, raises sealing nature, and raises intensity. Moreover, since the periphery part of the package with which an electrode terminal is located has a uniform

sticking-by-pressure side with said weld nature resin film, sealing nature improves.

[0012] Moreover, the reducing work process at which this 4th invention performs reducing work to a laminate film, The connection process to which a separator, a plus terminal plate, and a negative electrode plate are made to laminate or wind around through a liquid-retentive high gel electrolyte, the electrode group which is a generation element is formed in, and a positive pole terminal and a negative pole terminal, and said electrode group are connected, [the mode which makes said generation element include and exposes an electrode terminal to the exterior of a laminate film periphery part] It is the manufacture method of the nonaqueous electrolyte secondary battery characterized by consisting of a heavy process which piles up the laminate film with which reducing work was performed, and a laminate film, and a sealing process which presses simultaneously all the periphery parts of the piled-up laminate film, and carries out weld obturation.

[0013] Therefore, [according to the manufacture method of the nonaqueous electrolyte secondary battery invention of this application 4th] The reducing work process which performs reducing work to a laminate film, and a separator, The connection process to which a plus terminal plate and a negative electrode plate are made to laminate or wind around through the high gel electrolyte of electrolytic solution holdout, the electrode group which is a generation element is formed in, and a positive pole terminal and a negative pole terminal, and said electrode group are connected, [the mode which is made to include said generation element and is exposed to the exterior of an electrode terminal laminate film periphery part] the heavy process which piles up the laminate film with which reducing work was performed, and a laminate film, the sealing process which presses simultaneously all the periphery parts of the piled-up laminate film, and carries out weld obturation, ** and others -- since it is characterized by things There is an advantage *****, productivity, and whose workability improve a complicated process. Moreover, weld obturation of the laminate film can be carried out safely, without spilling liquid from having adopted the liquid-retentive high gel electrolyte. Moreover, at an obturation process, since weld obturation of all the periphery parts of the piled-up laminate film is carried out simultaneously, the defect at the time of weld obturation can be prevented, and the yield can be raised.

[0014] Moreover, this 5th invention is characterized by performing said sealing process, after decompressing atmosphere in predetermined atmospheric pressure.

[0015] Therefore, according to the manufacture method of the nonaqueous electrolyte secondary battery invention of this application 6th, since said sealing process is performed after decompressing atmosphere in predetermined atmospheric pressure, the adhesion between electrode groups improves and a battery characteristic improves as the result.

[0016] Moreover, this 6th invention is characterized by said predetermined atmospheric pressure being 0.5 atmosphere or less.

[0017] A battery characteristic improves with pressure reduction. As for the grade of pressure reduction, from the starting viewpoint, it is desirable to make it higher. However, if the degree of pressure reduction is made high, great time and large-scale equipment will be required in connection with it. Then, the time which ***** and pressure reduction take the large-scale equipment needed for pressure reduction can also be shortened, and cycle time shortening of a production line can be realized because predetermined atmospheric pressure shall be about 0.5 atmosphere or less. That is, workability and productivity can be raised, cost can be reduced further, and industrial application can be made easy.

[0018] Moreover, it is characterized by said sealing process making this application 7th the process which performs the press between which the sheet member was made to be placed in the polymerization field of said electrode terminal and all the periphery parts of the piled-up laminate film.

[0019] Therefore, according to the manufacture method of the nonaqueous electrolyte secondary battery invention of this application 7th, [said sealing process] There is an advantage which can ensure obturation safely in the polymerization field of said electrode terminal and all the periphery parts of the piled-up laminate film, without giving heat or mechanical load to said electrode terminal, since it is characterized by considering it as the process which performs the press between which the sheet member was made to be placed.

[0020]

[Mode for carrying out the invention] With reference to Drawings, it explains below per the nonaqueous electrolyte secondary battery of the form of operation of this invention, and its manufacture method.

[0021] The sectional view and drawing 3 as which form drawing 1 of operation was seen from the sectional view of the laminate film of the form of operation of this invention, and drawing 2 regarded the nonaqueous electrolyte secondary battery of the form of operation of this invention from the underside are the A-A' sectional view of the nonaqueous electrolyte secondary battery of the form of operation of this invention. First, with reference to drawing 1 , the composition is explained about the laminate film of the nonaqueous electrolyte secondary battery of the form of operation of this invention. The laminate film 1 to apply is 3-fold structure, and the resin films 2, such as polyethylene terephthalate with intensity high as a protective layer or nylon, are arranged outside. It consists of arranging the weld nature resin films 3, such as denaturation polypropylene, on an inner surface, and arranging the metallic foil 4, such as aluminum foil, on a core material. Moreover, adhesive good acid denaturation polyolefin with aluminum or an aluminum alloy etc. with which the weld nature resin film 3 becomes the base material of a laminate film 1, i.e., a core material, It is desirable to use metal adhesive resin, such as ionomer, an ethylene-vinyl acetate copolymer, an ethylene acrylic acid copolymer, and an ethylene methacrylic acid copolymer. However, if a metal adhesive line is prepared in a part

for a terminal area with a terminal, it is also possible to use polypropylene or polyethylene.

[0022] Next, with reference to drawing 2 and drawing 3, the composition of the nonaqueous electrolyte secondary battery of the form of operation of this invention is explained. As shown in drawing 2 and drawing 3, [the composition of the nonaqueous electrolyte secondary battery of the form of operation of this invention] It has the generation element 10 which consists of an electrode group 9 which consists of high gel electrolytes (not shown) of the plus terminal plate 6, a negative electrode plate 7, a separator 8, and electrolytic solution holdout in the package made from a laminate film (the following, package 5). Moreover, the generation element 10 piles up two electrode groups 9 inside a package 5, and is constituted. Furthermore, it has connected with the negative pole terminal 11, and the negative electrode plate 7 of the generation element 10 has connected the plus terminal plate 6 to the positive pole terminal 12. In addition, the built generation element 10 has the high gel electrolyte of electrolytic solution holdout, and does so the effect of preventing a liquid spill. Moreover, although it sinks into the gel electrolyte into the base material porosity of a separator 8, in order for what is necessary to be for one or more elements just to apply or sink in among the generation elements 10, it is not limited to this. Furthermore, the gel electrolyte used with the nonaqueous electrolyte secondary battery of the form of this operation shall have the ARUKIRU frame which contains fluoride, for example, and should be formed in the shape of a solid by making into a gel frame matrix the polymer polymerized and generated from the monomer which has a polymerization nature functional group in molecular structure as a functional group. Moreover, said polymerization nature functional group is a vinyl-polymers ketone system or a vinyl-polymers system, for example, are an acrylyl group, a methacryloyl machine, and an allyl group. Since the polymerization formation object which polymerizes the monomer containing fluoride has Alekan who contains fluoride in a frame, it is small. [of an interaction with a solvent molecule or a solute molecule] Moreover, it is electrochemically [chemically and] stable. Moreover, although acid ester structure remains in a main skeleton, it is desirable to adopt an above-mentioned gel electrolyte from the ability of SHINERISHISU of a solvent to be prevented by existence of a moderate polar group. When it explains still in detail about an above-mentioned gel electrolyte, moreover, polyethylene oxide, The copolymer of polyethylene oxide, polyacrylonitrile, polyvinylidene fluoride, It is desirable to use the bridge construction object which has the straight chain which has the copolymer of polyvinylidene fluoride, the copolymer of 6 fluoridation propylene, poly methyl methacrylate, poly acryl amide, polycarbonate, or a ** hetero atom in a polymer molecule, or a ** hetero atom in a polymer molecule.

[0023] furthermore -- in addition, sealing nature is improved in the periphery part 13 of a package 5 -- it should make -- abbreviation -- the uniform indentation pattern 14 is arranged. The indentation pattern 14 to apply is formed in the periphery part 13 in a package at the time of obturation of the tool end face (not shown) which carries out press obturation of the

periphery part 13. That is, the indentation pattern 14 is formed by transferring the pattern (not shown) given to the tool end face. It says that the same indentation pattern 14 as the pattern which exists that the indentation pattern 14 said here is abbreviation homogeneity in said tool end face is formed in the periphery part 13 of a single obturation process. Therefore, when the press by a tool covers two or more times, and a compound pattern is formed, the indentation pattern 14 is not abbreviation homogeneity. On the other hand, when the gap (for example, gap of a dot) of the patterns beforehand formed on a tool end face is uneven, heterogeneity and the case where it becomes discontinuous have the indentation pattern 14 on the periphery part 13 by which the pattern which requires the pattern on a tool end face itself as heterogeneity and a discontinuous result was transferred. In that case, as long as only the same indentation pattern 14 as the pattern on a tool end face exists in the periphery part 13, when the indentation pattern 14 which this invention says is abbreviation homogeneity, it corresponds. As mentioned above, since dissolution obturation of all those periphery parts 13 is carried out at abbreviation coincidence, the periphery part 13 of a package 5 does so the effect that birth of a wrinkle etc. is not accepted at, but sealing nature and whose airtightness improve, and the yield improves. [0024] Next, the manufacture method of the nonaqueous electrolyte secondary battery of the form operation of this invention is explained with reference to drawing 1 , drawing 2 , drawing 3 , and drawing 4 . Drawing 4 is the manufacturing process figure of the nonaqueous electrolyte secondary battery of the form of operation of this invention. As shown in drawing 4 , the manufacture method of the nonaqueous electrolyte secondary battery of the form operation of this invention cuts a laminate film 1 in a predetermined size, for example, the form near a final product, at the cutting process 15 first. Next, at the reducing work process 16, reducing work is performed to the laminate film (not shown) cut by the prescribed dimension.

[0025] Moreover, after applying or infiltrating the high gel electrolyte (not shown) of electrolytic solution holdout into the whole surface of the separator 8 which contacts the whole surface of a separator 8 and the negative electrode plate 11 which contact the plus terminal plate 6 at the connection process 17, After making a separator 8, the plus terminal plate 6, and a negative electrode plate 7 laminate or wind and making the electrode group 9 which is the generation element 10 form, an electrode group 9 is connected with the positive pole terminal 12 and the negative pole terminal 11 (electrode terminal). In addition, although a gel electrolyte is applied or infiltrated into a separator 8 with the form of this operation, you may apply or infiltrate all the elements or one or more elements among a separator 8, the plus terminal plate 12, and a negative electrode plate 11.

[0026] Next, the drawing finishing laminate film (not shown) which passed through the reducing work process 16 is used as an underside, and said generation element 10 is made to carry in a predetermined position at the heavy process 18. The generation element 10 is carried in the

mode which the positive pole terminal 12 and the negative pole terminal 11 which were connected to the generation element 10 extract, and projects in a part of periphery part 13 of an ending laminate film in that case. Then, the drawing-less laminate film cut by the prescribed dimension which has not performed drawing is piled up from the upper part.

[0027] Next, the atmosphere of the laminate film (not shown) piled up by the sealing process 19 is decompressed. In that case, the more it makes the degree of pressure reduction high, the more a battery characteristic improves. A battery characteristic improves with pressure reduction. As for the grade of pressure reduction, from the starting viewpoint, it is desirable to make it higher. However, if the degree of pressure reduction is made high, great time and large-scale equipment will be required in connection with it. Then, the time which ***** and pressure reduction take the large-scale equipment needed for pressure reduction can also be shortened because predetermined atmospheric pressure shall be 0.5 atmosphere or less, and there is an advantage which can realize shortening the cycle time of a production line. That is, workability and productivity can be raised, cost can be reduced further, and industrial application can be made easy. Weld obturation of all the periphery parts 13 of the piled-up laminate film is carried out after pressure reduction at abbreviation coincidence, and it is made a package. In addition, the abbreviation coincidence said here means carrying out weld closure of all the periphery parts 13 of the laminate film substantially piled up at one process. Moreover, the periphery part 13 of the piled-up laminate film and the periphery part 13 of a package point out the same position.

[0028] Thus, weld obturation of all the periphery parts 13 is carried out by the sealing process 19 at abbreviation coincidence. By considering it as the starting process, birth of nonuniformity, such as a wrinkle produced when being stuck by pressure one by one partially [the former], can be prevented, and the airtightness of a battery can be raised. Here, how to carry out weld obturation is explained. As a method of carrying out weld obturation, a high frequency method or a heat block method is used. Said high frequency method is a method made to generate heat from the metal body itself by applying high frequency to metal. Said heat block method is a method which is made to generate heat from the tool end face (not shown) which welds by pressure the periphery part 13 concerning the periphery part 13 of a package, is made to heat the weld nature resin film 3 of the laminate film piled up at the time of sticking by pressure of a tool end face, and carries out dissolution obturation. With the form of this operation, a laminate film 1 is 3-fold structure, and since it has above-mentioned structure, it is desirable for the meaning which does not degrade the resin film 2 of the laminate film 1 upper surface to also adopt a high frequency method. Moreover, the indentation pattern 14 can be made to form in the periphery part 13 of a package 5 by preparing a pattern (not shown) in the tool end face welded by pressure to the periphery part 13 of a package 5 on the occasion of weld obturation. By making the indentation pattern 14 form in the periphery part 13 of a package 5, the sealing

nature of a package 5 and airtightness can be raised further. In this case, the periphery part 13 in which the positive pole terminal 12 and the negative pole terminal 11 are located will cause a short circuit, if the pattern prepared in the tool end face penetrates the positive pole terminal 12 or the negative pole terminal 11 when making the indentation pattern 14 form. However, the film (not shown) which becomes the periphery part 13 in which the positive pole terminal 12 and the negative pole terminal 11 which the pattern prepared in the tool end face welds by pressure are located with material, such as a plastic and resin, is made to carry, and such a problem can be solved by controlling the pressure impressed from a tool end face. Moreover, the indentation pattern 14 formed by the manufacture method of the nonaqueous electrolyte secondary battery of the form this operation is the indentation pattern 14 which the pattern which is not formed with a film and formed by the pattern of a tool end face being transferred says here. Moreover, the calorific value (temperature) from the metal by a high frequency method is determined by the distance of the metal body used as a high frequency generator and its object, the kind of target metal body, and the strength of high frequency. When the strength of high frequency is constant and the kind of target metal body is the same, especially the calorific value is in inverse proportion to distance. Therefore, as compared with other periphery parts 13, a large next door and temperature are controlled for the distance from a tool end face by making a film carry in the periphery part 13 in which the positive pole terminal 12 and the negative pole terminal 11 are located, and the periphery part 13 in which the film was made to carry serves as low temperature by it as compared with other periphery parts 13. As the result, the dissolution rate of the weld resin film 3 can be controlled, the load given to the positive pole terminal 12 and the negative pole terminal 11 can reduce, and weld obturation can be carried out safely and certainly. Moreover, when adopting a heat block method, it is desirable for the meaning which does not degrade a laminate film 1, the positive pole terminal 12, and the negative pole terminal 11 to also make said film low thermal conductivity. Moreover, when using a film in the mode covered to two or more electrode terminals (not shown), in order to prevent the short circuit by the energization very between two of a plus terminal and the negative electrode especially, it is desirable to adopt an insulating film.

[0029] Next, pressure reduction release is carried out at the cutting process 20, and the periphery part of said package is cut in a predetermined position. Moreover, the weld nature resin film 3 projected to the exterior of the periphery part 13 by sticking by pressure serves as a mode which covers the origin of the positive pole terminal 12 and the negative pole terminal 11 by cutting except the periphery part in which the positive pole terminal 12 and the negative pole terminal 11 are located. The stress concentration of the periphery part 13 located in the origin of the positive pole terminal 12 and the negative pole terminal 11 is made to avoid as a result, and the intensity of a package 5 is raised. Moreover, the nonaqueous electrolyte

secondary battery of the form of this operation is charged after passing through the cutting process 20.

[0030] By the nonaqueous electrolyte secondary battery and its manufacture method of a form of operation of this invention, the laminate film which performed reducing work, and the laminate film which has not performed reducing work are piled up, and the process is advanced one by one. However, even if it piles up the laminate films which performed reducing work, the manufacture method of the nonaqueous electrolyte secondary battery of this invention can be performed. Moreover, after performing reducing work to the laminate film before making reverse process order of the cutting process 15 and the reducing work process 16 of a laminate film of cutting a laminate film to a prescribed dimension and cutting it, a laminate film may be cut to a prescribed dimension and a process may be advanced one by one. Moreover, after performing reducing work to the laminate film of while it is a long picture, while starts, the generation element 10 obtained at the connection process 17 in the predetermined position of the laminate film is made to carry, and the laminate film (with those with reducing work or no reducing work) of the long picture of another side is piled up. Then, it is also possible to cut the laminate film used as a package to a prescribed dimension through the sealing process 19.

[0031] Moreover, other examples of composition of the generation element which is one component of the nonaqueous electrolyte secondary battery of the form of operation of above-mentioned this invention are explained with reference to drawing 5. Drawing 5 is the A-A' sectional view of the nonaqueous electrolyte secondary battery of the form of operation of this invention shown in above-mentioned drawing 1. The plus terminal plate 6 consists of the positive electrode current collector 21 and the quality 22 of cathode active material, such as aluminum, among the generation elements 10 which consist of electrode groups 9, and a negative electrode plate 7 consists of the negative electrode collector 23 and the negative electrode active material 24, such as copper. Moreover, as quality 22 of cathode active material, the following charges of a battery electrode material are mentioned. Namely, I fellows metallic compounds, such as CuO, Cu₂O, Ag₂O, CuS, and CuSO₄, IV fellows metallic compounds, such as TiS₂, SiO₂, and SnO, V₂O₅, V₆O₁₂, VO_x, VI fellows metallic compounds, such as V fellows metallic compounds, such as Nb₂O₅, Bi₂O₃, and Sb₂O₃, CrO₃, Cr₂O₃, MoO₃, MoS₂, WO₃, and SeO₂, VIII fellows metallic compounds, such as VII fellows metallic compounds, such as MnO₂ and Mn₂O₃, Fe₂O₃, FeO, Fe₃O₄, nickel₂O₃, NiO, CoO₃, and CoO, Or it is expressed with general formula L_xMX₂, L_xMN_yX₂ (M and N show VIII fellows' metal from I, and X shows chalcogen compounds, such as oxygen and sulfur.), etc. For example, metallic compounds, such as a lithium Cobalt system compound oxide or a lithium manganese system compound oxide, Furthermore, although it is conductive polymer compounds, such as disulfide, polypyrrole, poly aniline, poly para-phenylene, polyacetylene,

and the poly ASEN system material, a ** graphite structure carbon material, etc., it is not limited to these. Furthermore, as negative electrode active material 24, the following charges of a battery electrode material are mentioned. Namely, analysis result according to X-ray diffraction etc. in carbonaceous materials, such as carbon, especially a graphite material, and [, for example, the above-mentioned carbonaceous material,;

A lattice spacing (d002) 3.33 to 3.05Å Size of the crystallite of a axial direction La 200Å or more Size of the crystallite of c axial direction Lc 200Å or more True density They are not the nature powder of graphite for which 2.25g/cm³ of pitches of anisotropy were calcinated at the temperature of 2000 degrees C or more from 2.00 again, and the thing limited to these ranges, of course although the above-mentioned graphite material is Lc<100nm staple-like carbon fiber or meso carbon micro beads desirably.]

The material which added a phosphorus and boron in order to improve negative electrode characteristics to metal oxides, such as a stannic acid ghost and a silicon oxide, and the further above-mentioned electrochemical active material, and performed reforming is mentioned. Moreover, although lithium metal inclusion alloys, such as lithium metal, lithium aluminum, a lithium lead, lithium tin, lithium aluminum tin, lithium gallium, and a woods alloy, etc. are used for the negative electrode active material 24, it is not limited to these. Moreover, it is also possible to use together the organic compound containing lithium metal, a lithium alloy, and lithium or to insert lithium in said carbonaceous material beforehand by returning electrochemically beforehand. The same effect as the nonaqueous electrolyte secondary battery of the form of this operation of the generation element 10 also as the above composition can be acquired. Moreover, the nonaqueous electrolyte secondary battery which includes the generation element shown in drawing 5 can also be manufactured by the manufacture method of the nonaqueous electrolyte secondary battery of the form this operation of this invention mentioned above.

[0032]

[Effect of the Invention] The nonaqueous electrolyte secondary battery of this invention explained above has high airtightness, and can prevent the short circuit and liquid spill by vibration, a shock, bending, etc. Moreover, since manufacture is easy, safety, workability, and productivity are high and there are few processes, there is an advantage on which cost is reduced. Moreover, since weld obturation of all the periphery parts is carried out at abbreviation coincidence, the yield can be improved.

[Brief Description of the Drawings]

[Drawing 1] The sectional view of the laminate film of the form of operation

[Drawing 2] The sectional view of the nonaqueous electrolyte secondary battery of the form of operation

[Drawing 3] The A-A' sectional view of the nonaqueous electrolyte secondary battery of the form of operation

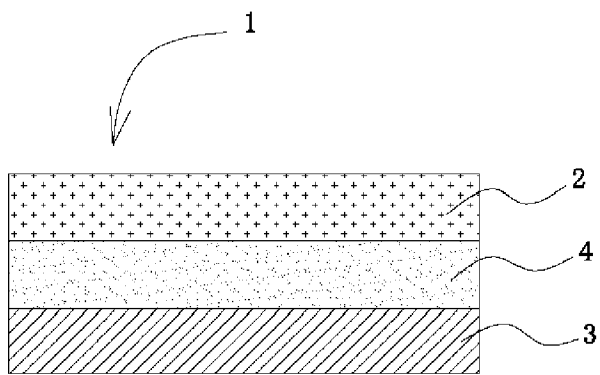
[Drawing 4] The manufacture method of the nonaqueous electrolyte secondary battery of the form operation

[Drawing 5] The A-A' sectional view of the nonaqueous electrolyte secondary battery of the form of operation

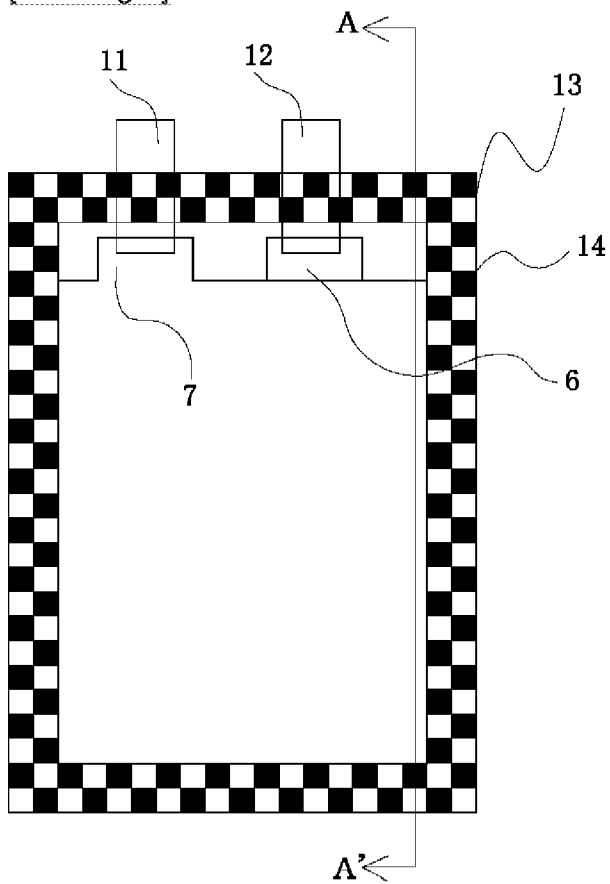
[Explanations of letters or numerals]

1. Laminate Film
2. Resin Film
3. Weld Nature Resin Film
4. Metallic Foil
5. Package
6. Plus Terminal Plate
7. Negative Electrode Plate
8. Separator
9. Electrode Group
10. Generation Element
11. Negative Pole Terminal
12. Positive Pole Terminal
13. Periphery Part
14. Indentation Pattern
15. Cutting Process
16. Reducing Work Process
17. Connection Process
18. Heavy Process
19. Sealing Process
20. Cutting Process
21. Positive Electrode Current Collector
22. Quality of Cathode Active Material
23. Negative Electrode Collector
24. Negative Electrode Active Material

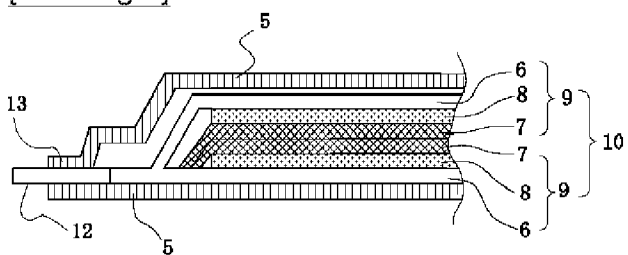
[Drawing 1]



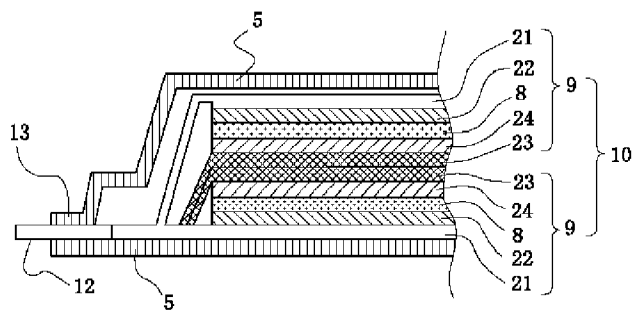
[Drawing 2]



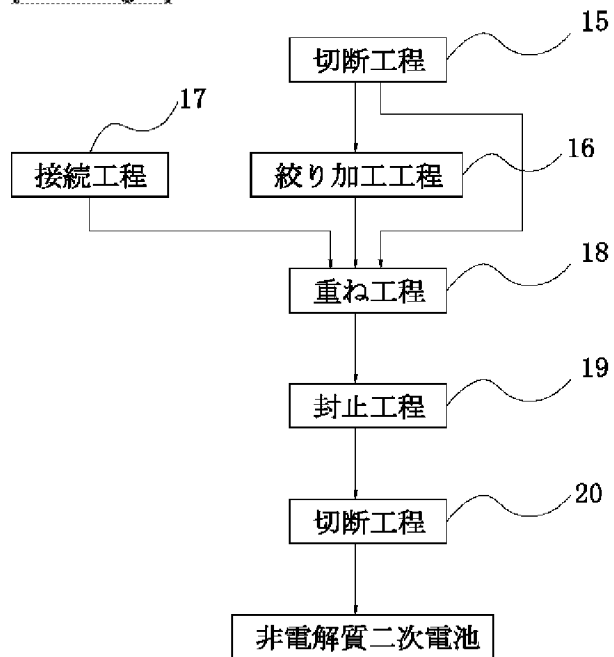
[Drawing 3]



[Drawing 5]



[Drawing 4]



[Translation done.]